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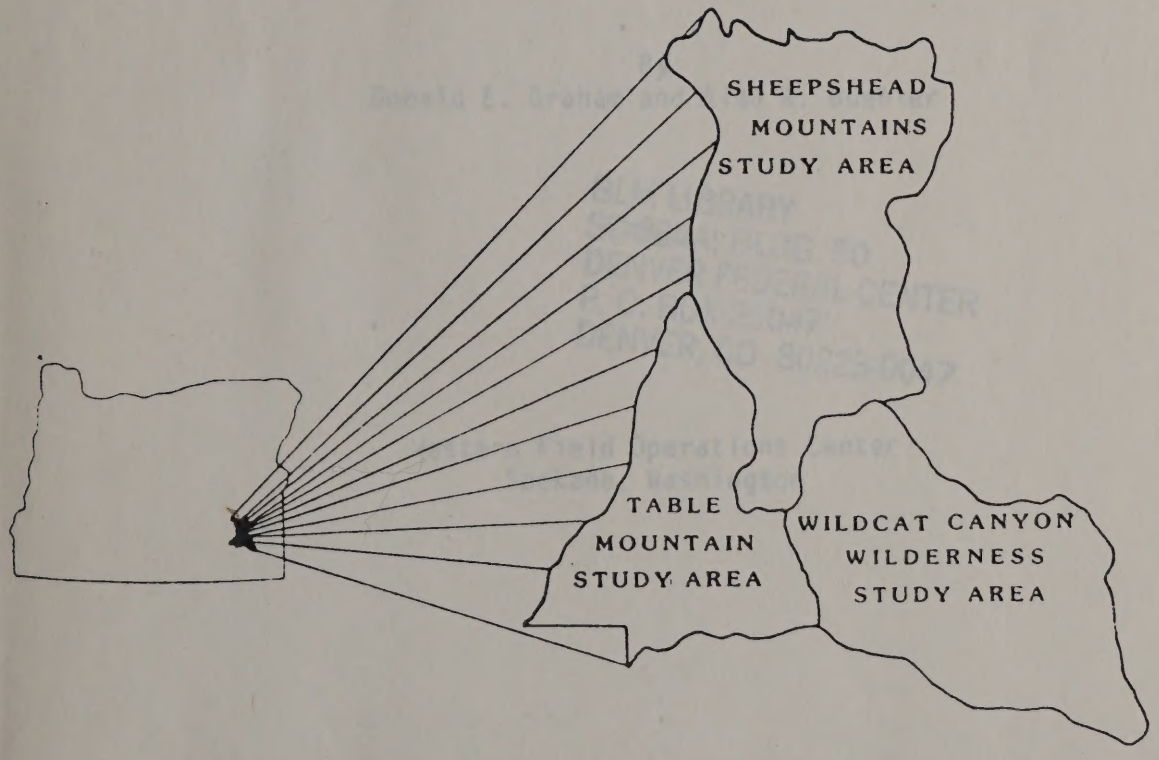
# Mineral Resources of the Sheepshead Mountains and Table Mountain Study Areas, and Wildcat Canyon Wilderness Study Area, Harney and Malheur Counties, Oregon

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# MINERAL RESOURCES OF THE SHEEPSHEAD MOUNTAINS AND TABLE MOUNTAIN STUDY AREAS, AND WILDCAT CANYON WILDERNESS STUDY AREA, HARNEY AND MALHEUR COUNTIES, OREGON

By
Donald E. Graham and Alan R. Buehler

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David S. Brown, Acting Director

# PREFACE

The Federal Land Policy and Management Act (Public Law 94-579, October 21, 1976) requires the U.S. Geological Survey and U.S. Bureau of Mines to conduct mineral surveys on U.S. Bureau of Land Management administered land designated as Wilderness Study Areas ". . . to determine the mineral values, if any, that may be present . . . ." Results must be made available to the public and submitted to the President and the Congress. This report presents the results of a Bureau of Mines mineral survey of parts of the Sheepshead Mountains (OR-002-072C) and Table Mountain (OR-002-072I) Wilderness Study Areas, Harney and Malheur Counties, and the Wildcat Canyon (OR-002-072D) Wilderness Study Area, Malheur County, OR.

This open-file report will be summarized in a joint report published by the U.S. Geological Survey. The data were gathered and interpreted by Bureau of Mines personnel from Western Field Operations Center, East 360 Third Avenue, Spokane, WA 99202. The report has been edited by members of the Branch of Resource Evaluation at the field center and reviewed at the Division of Mineral Land Assessment, Washington, DC.

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UNIT OF MEASURE ABBREVIATIONS USED IN THIS REPORT

| | |
|---|---|
| $yd^3$ | cubic yard |
| $^oF$ | degree Fahrenheit |
| $/$yd^3$ | dollar per cubic yard |
| $/oz | dollar per troy ounce |
| ft | foot |
| in. | inch |
| mi | mile |
| mg | milligram |
| $mi^2$ | square mile |

## SUMMARY

In 1986, at the request of the U.S. Bureau of Land Management, the U.S. Bureau of Mines studied a 45,705-acre part of the 54,430-acre Sheepshead Mountains Wilderness Study Area (OR-002-072C), a 25,185-acre part of the 40,592-acre Table Mountain Wilderness Study Area (OR-002-072I), and all of the 34,830-acre Wildcat Canyon Wilderness Study Area (OR-002-072D) in order to evaluate their identified mineral resources. These two study areas and one Wilderness Study Area are located in Harney and Malheur Counties, OR, about 75 miles southeast from Burns. The area is covered by basaltic lava and welded rhyolitic tuff and is bordered by numerous basins containing dried lake beds. No mining claims have been located in the areas studied, no production has been recorded, and no mineral resources have been identified.

Diatomite, contained in Tertiary lake sediments, occurs in the northeastern part of the Wildcat Canyon Wilderness Study Area. This occurrence contains an estimated 440,000 tons of diatomaceous earth. The fact that it is interbedded with a volcanic ash and has some 10 to 20 ft of overburden makes economic extraction of the material doubtful, especially considering the distance to any markets and competition from a recently opened mine 60 mi to the north, which has large reserves. Another diatomite occurrence, in the southern part of the Table Mountain study area, contains an excessive amount of impurities.

Three samples of alluvium out of fourteen taken showed small amounts of placer gold. These samples, one from a tributary of the Bone Canyon drainage in the southeastern portion of the Wildcat Canyon Wilderness Study Area, one from a tributary of Wildcat Creek in the southern portion of the Wildcat Canyon Wilderness Study Area, and one from the western portion of the Table Mountain study area contained 0.02, 0.05, and 0.09 milligrams of gold, the equivalent of \$0.03, \$0.15, and \$0.26/$yd^3$, respectively. This concentration of gold is of no economic interest.

The presence of hot springs several miles southwest of the Table Mountain study area indicates a favorable environment for geothermal resources; however, no surface manifestations were observed within the boundaries of the study areas. The Table Mountain study area is adjacent to the Mickey Hot Springs Known Geothermal Resource Area. Geothermal leases covered 7,376 acres in the Table Mountain Wilderness Study Area in 1984; however, there are at present no geothermal leases active in the area studied for this report. No geothermal exploration has been recorded.

In 1984, nine oil and gas leases covered 18,000 acres in the Table Mountain Wilderness Study Area, and two oil and gas leases covered 3,700 acres in the Sheepshead Mountains Wilderness Study Area. At present there are no active oil and gas leases in either study area. No oil and gas drilling or exploration has been recorded.

## INTRODUCTION

This report describes the USBM (U.S. Bureau of Mines) portion of a cooperative study with the USGS (U.S. Geological Survey) to evaluate mineral resources and mineral potential of the Sheepshead Mountains and Table Mountain study areas and the Wildcat Canyon WSA (Wilderness Study Area) at the request of the BLM (U.S. Bureau of Land Management). The USBM uses all pertinent mining-activities data and information from site-specific examinations of mine workings or known mineral occurrences to identify mineral resources. The USGS uses areal geological, geochemical, and geophysical surveys to evaluate the potential for undiscovered resources. Results of these investigations are combined and will be used to help determine the acceptability of the study area for inclusion into the National Wilderness Preservation System. Although the immediate goal of this and other USBM mineral surveys is to provide data for the President, Congress, government agencies, and the public for land-use decisions, the long-term objective is to ensure the Nation has an adequate and dependable supply of minerals at a reasonable cost.

### Setting

The Sheepshead Mountains and Table Mountain study areas and the Wildcat Canyon Wilderness Study Area (fig. 1) encompass a total of 105,720 acres 1/ of basaltic lava flows in an area which is transitional between the Basin and Range and the Columbia Intermontane geomorphic provinces (Thornbury, 1965). The areas studied are on public land administered by the BLM in the Andrews Resource Area, Burns District; and Southern Malheur Resource Area, Vale District.

Access to the areas studied is provided by U.S. Highway 95 to the east and Oregon State Highway 78 to the north (fig. 1), which are 1 to 8 mi from the northern and eastern study area boundaries, and a gravel road which runs south from Folly Farm to Fields, OR. Unimproved roads separate the three areas studied (figs. 2-4), and jeep roads and trails provide access to the interior portions of the study areas. The areas studied are extremely remote, being about 150 mi west of Boise, ID, 110 mi north of Winnemucca, NV, and 75 mi southeast of Burns, OR. Burns, on the Union Pacific Railroad, and Winnemucca, on the Western Pacific Railroad, are the nearest railroad shipping points.

---

| 1/ Name | WSA Acreage | Acres studied |
|---|---|---|
| Sheepshead Mountain | 54,430 | 45,705 |
| Table Mountain | 40,592 | 25,185 |
| Wildcat Canyon | 34,830 | 34,830 |

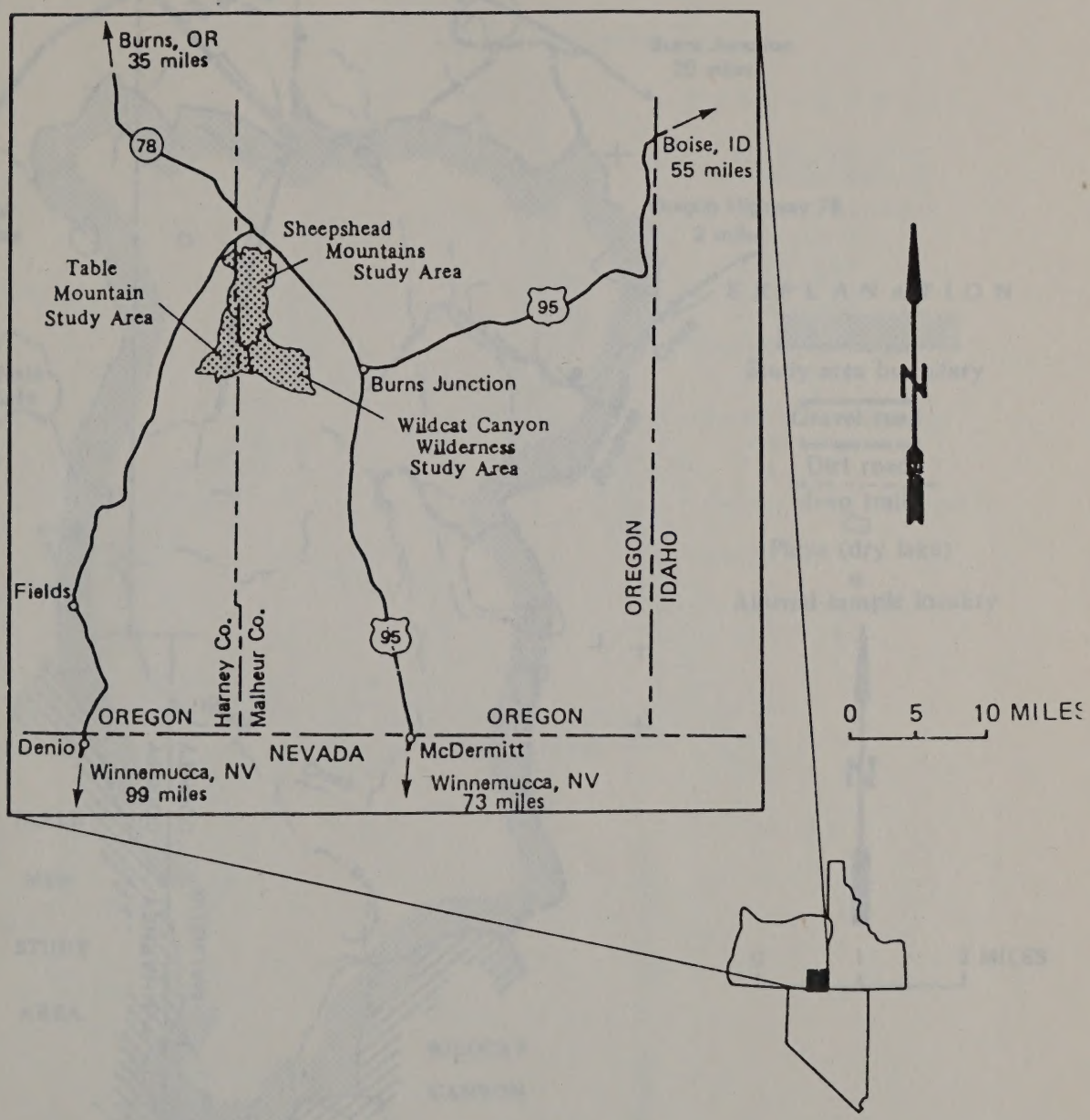



FIGURE 1.– Location of the Sheepshead Mountains and Table Mountain study areas and Wildcat Canyon Wilderness Study Area, Harney and Malheur Counties, OR

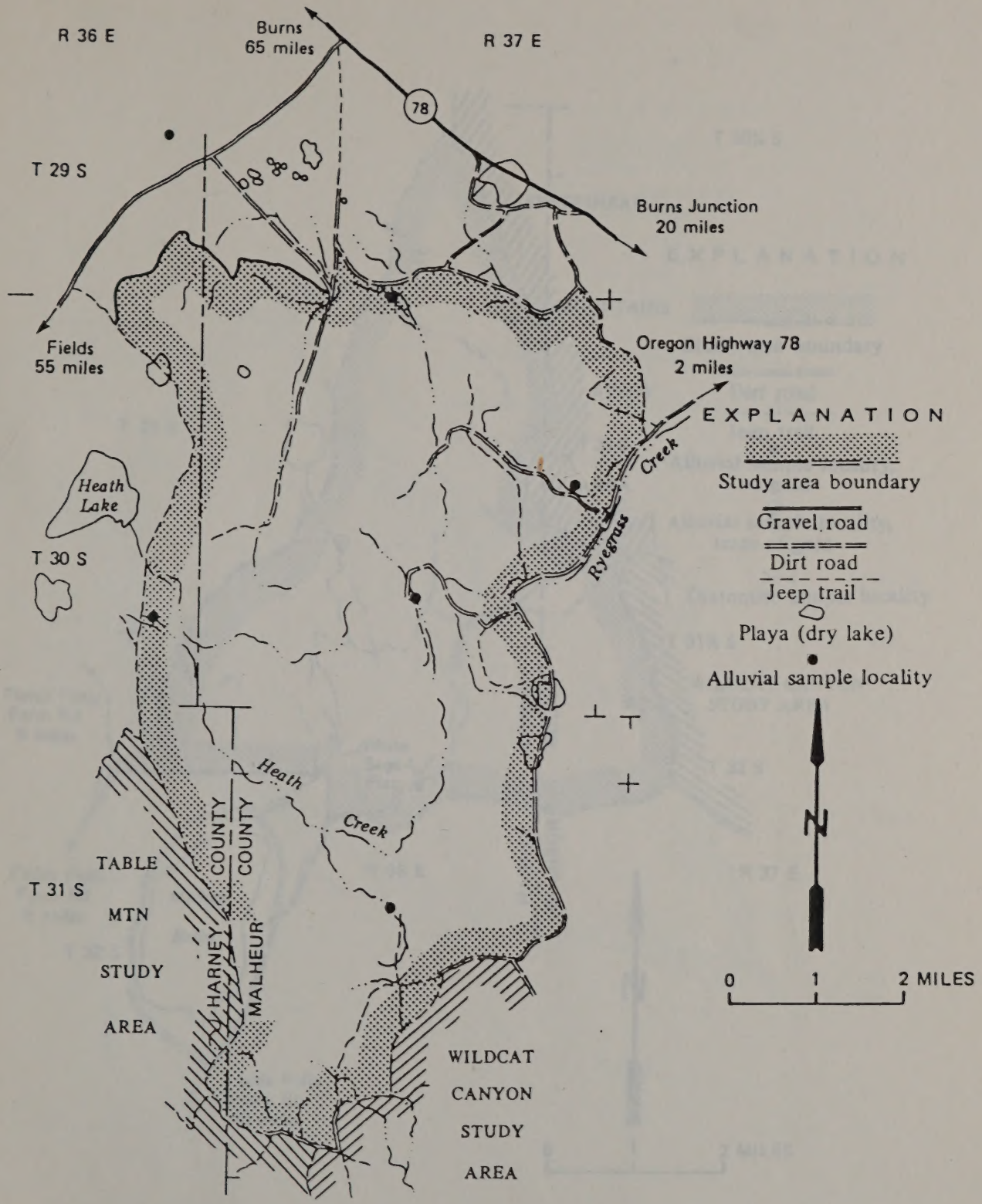



FIGURE 2.– Sample localities in and adjacent to the Sheepshead Mountains study area, Harney and Malheur Counties, OR

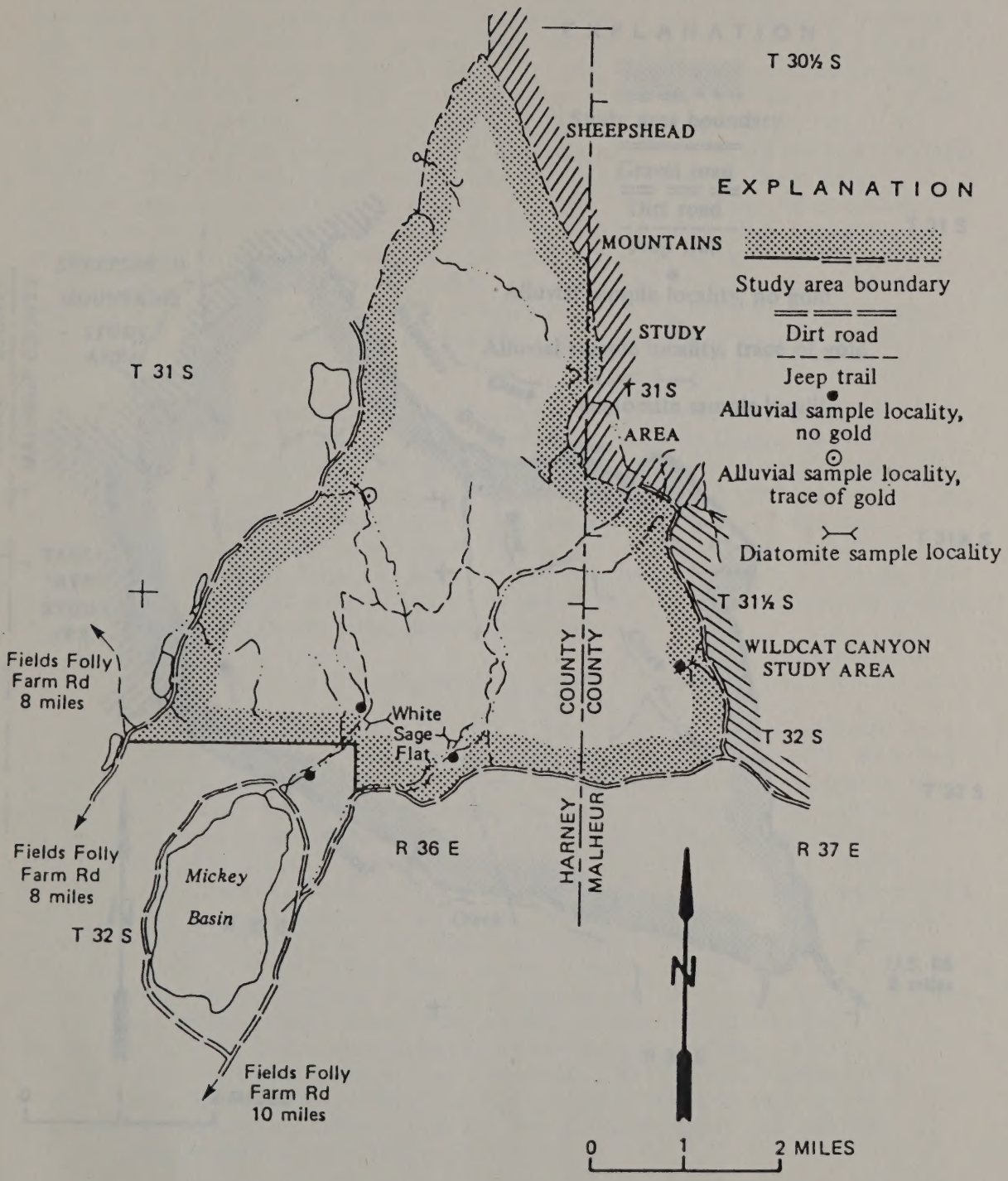



FIGURE 3.– Sample localities in and adjacent to the Table Mountain study area, Harney and Malheur Counties, OR

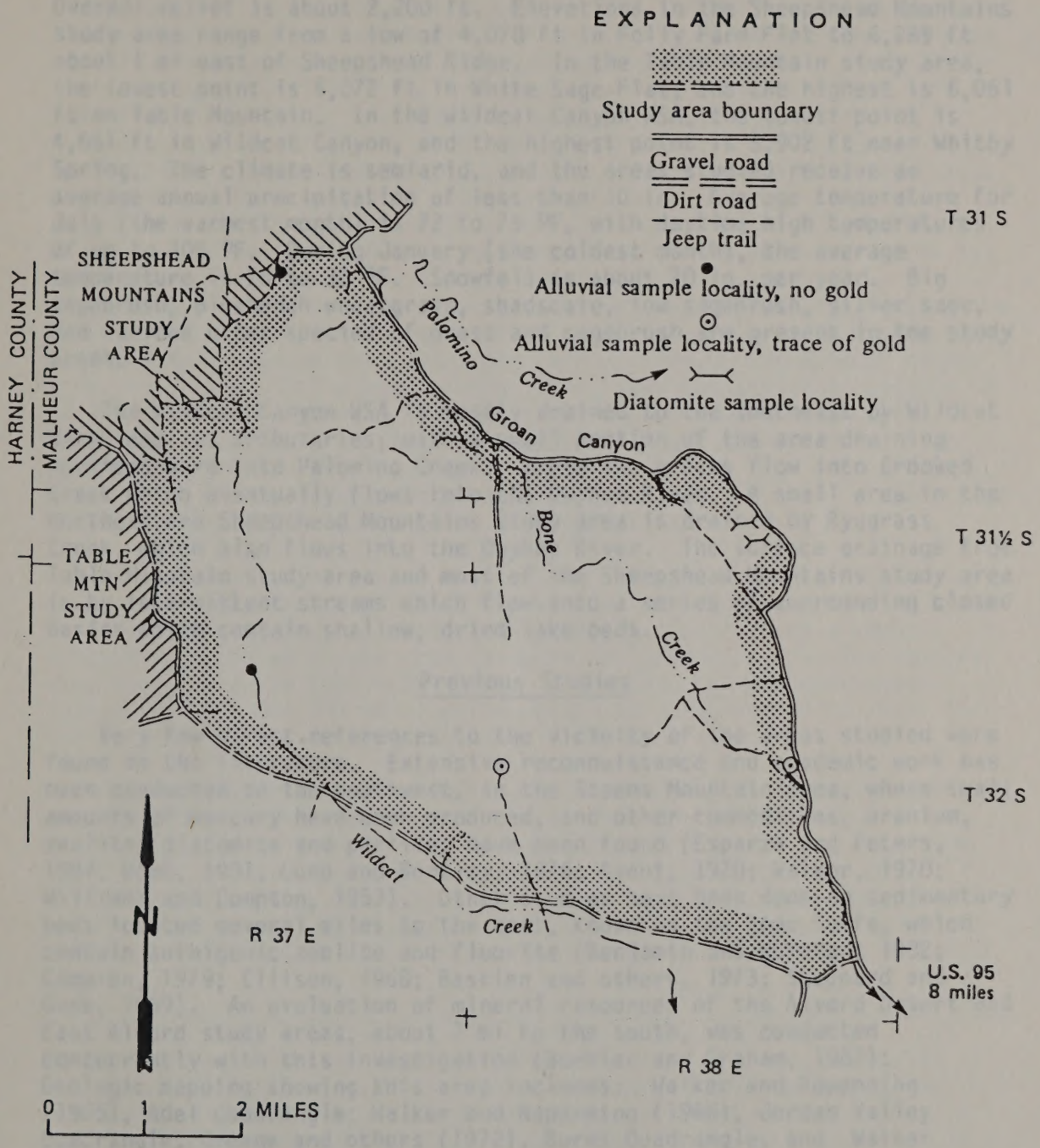
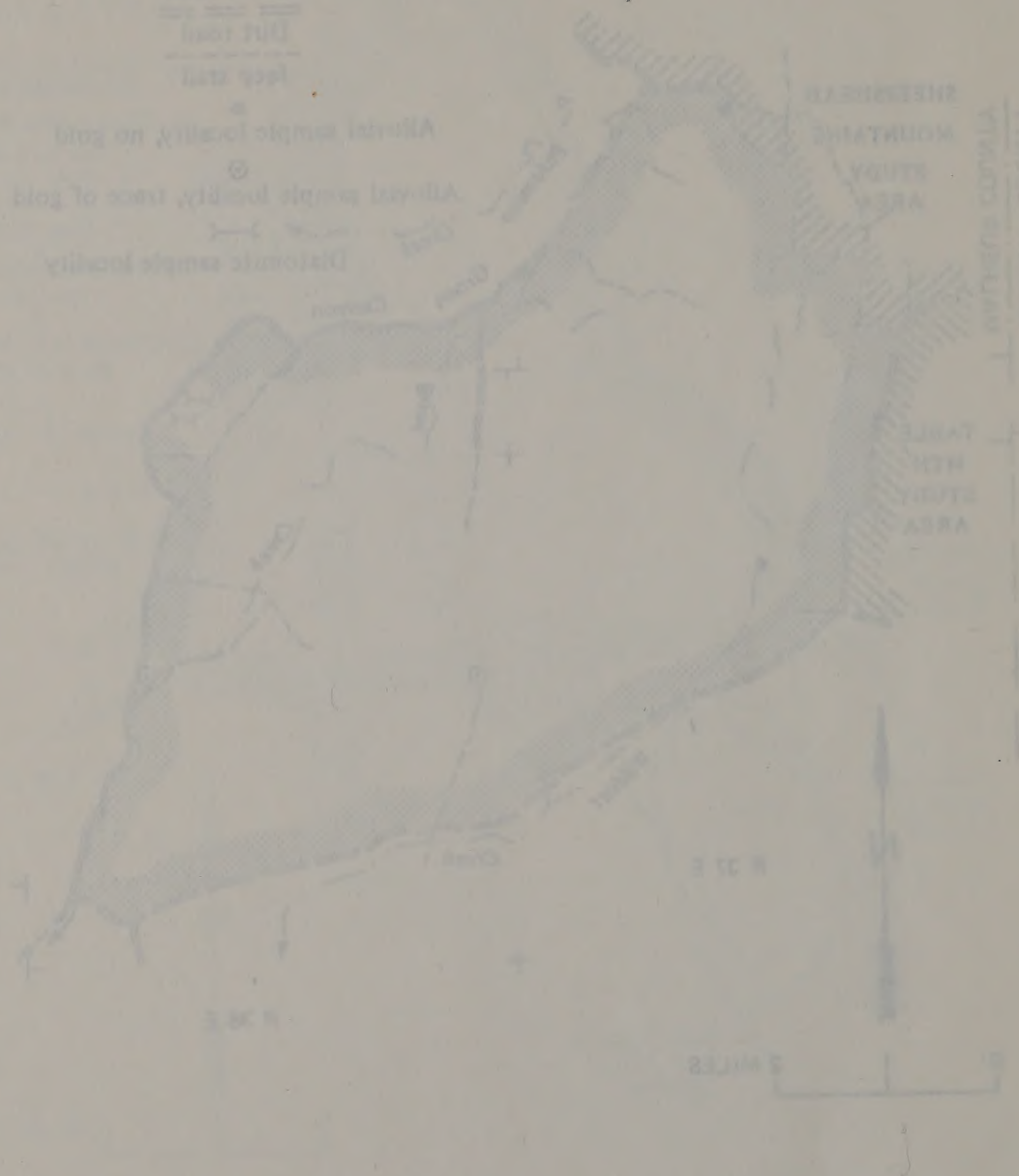



FIGURE 4.– Sample localities in the Wildcat Canyon Wilderness Study Area, Malheur County, OR



The most prominent topographic features include Table Mountain, a large, flat-topped mesa, and Sheepshead Ridge, a west-facing fault scarp almost 2,000 ft high and 8 mi long, displaying a series of lava flows. Overall relief is about 2,200 ft. Elevations in the Sheepshead Mountains study area range from a low of 4,070 ft in Folly Farm Flat to 6,289 ft about 1 mi east of Sheepshead Ridge. In the Table Mountain study area, the lowest point is 4,072 ft in White Sage Flat, and the highest is 6,061 ft on Table Mountain. In the Wildcat Canyon WSA, the lowest point is 4,051 ft in Wildcat Canyon, and the highest point is 5,902 ft near Whitby Spring. The climate is semiarid, and the areas studied receive an average annual precipitation of less than 10 in. Average temperature for July (the warmest month) is 72 to 75 $^{o}$F, with daytime high temperatures of up to 105 $^{o}$F. During January (the coldest month), the average temperature is 25 to 32 $^{o}$F. Snowfall is about 20 in. per year. Big sagebrush, bluebunch wheatgrass, shadscale, low sagebrush, silver sage, and various other species of grass and sagebrush are present in the study areas.

The Wildcat Canyon WSA is mostly drained to the southeast by Wildcat Creek and its tributaries, with a small portion of the area draining northeastward into Palomino Creek. These two creeks flow into Crooked Creek which eventually flows into the Owyhee River. A small area in the northeastern Sheepshead Mountains study area is drained by Ryegrass Creek, which also flows into the Owyhee River. The surface drainage from Table Mountain study area and most of the Sheepshead Mountains study area is by intermittent streams which flow into a series of surrounding closed basins which contain shallow, dried lake beds.

## Previous Studies

Very few direct references to the vicinity of the areas studied were found in the literature. Extensive reconnaissance and academic work has been conducted to the southwest, in the Steens Mountain area, where small amounts of mercury have been produced, and other commodities, uranium, zeolite, diatomite and perlite, have been found (Esparza and Peters, 1987; Hook, 1981; Lund and Bentley, 1976; Avent, 1970; Walker, 1970; Williams and Compton, 1953). Other studies have been done on sedimentary beds located several miles to the east, known as the Rome Tuffs, which contain authigenic zeolite and fluorite (Benjamin and McMahan, 1982; Campion, 1979; Ellison, 1968; Bastien and others, 1973; Sheppard and Gude, 1969). An evaluation of mineral resources of the Alvord Desert and East Alvord study areas, about 7 mi to the south, was conducted concurrently with this investigation (Buehler and Graham, 1987). Geologic mapping showing this area includes: Walker and Repenning (1965), Adel Quadrangle; Walker and Repenning (1966), Jordan Valley Quadrangle; Greene and others (1972), Burns Quadrangle; and Walker (1977), Oregon east of the 121st meridian.

## Present Study

Work by USBM personnel entailed prefield work in late 1985 and early 1986 and field work during the summer of 1986. Prefield studies included library research and investigation of BLM mining claim and mineral lease records. Bureau of Mines and other production records were searched and pertinent data compiled. Field studies involved ground searches for deposits of zeolite 2/ and diatomite 3/ within and adjacent to the studied areas in localities which appeared favorable for those commodities. Field studies also involved searches for mineralized areas that may have had unreported mining-related activity. Several occurrences of sedimentary rocks which appeared zeolitic were noted, all in the eastern portion of the Sheepshead Mountains study area and in the northwestern portion of the Wildcat Canyon WSA. Two areas of diatomaceous sediments were examined; one was near White Sage Flat in the southern portion of the Table Mountain study area (fig. 3) and the other was near Groan Canyon in the northeastern portion of the Wildcat Canyon study area (fig 4). Eleven samples were taken and sent for analysis of possible zeolitic material, and ten samples were taken of sediments containing diatomite. Fifteen reconnaissance pan samples of alluvium were taken from the areas studied, and one was taken from an inactive claim north of the Sheepshead Mountains study area. Playas in and around the study areas were examined for crusts of borate minerals.

Two types of rock samples were taken: 1) chip--a regular series of rock chips taken in a continuous line across a mineralized zone or other exposure; 2) grab--rock pieces taken unsystematically from a dump, stockpile, or float (loose rock lying on the ground). Alluvial samples were reconnaissance pans: one level 14-in.-diameter pan containing approximately 0.004 $yd^3$ of alluvium which was concentrated to check for the presence of placer gold and other heavy minerals.

Diatomite samples were examined microscopically to determine the type and percentage of diatoms present and the amounts of contaminants. Selected samples, those with the least amount of impurities, were then submitted for whole-rock analysis to determine the percentage of major-element oxides. Zeolite samples were initially tested with a cation-exchange test developed by Helfferich (1964). Samples showing a positive reaction on this test were then submitted for x-ray diffraction

---

2/ Zeolites are hydrated aluminosilicate minerals. Their commercial characteristics include a high ion exchange capacity and the ability to adsorb and desorb water without loss of crystal structure. Industrial use includes filtration of gases and solids, filler in paper, and soil conditioner.

3/ Diatomite is a sedimentary rock which consists of siliceous remains of diatoms--one-celled plants. Useful characteristics are high surface area, high absorptive capacity, chemical stability. Commercial uses include filter aid, mineral filler, and abrasive.

## Present Study

Work by USBM personnel entailed preliminary work in late 1985 and early 1986 and field work during the summer of 1986. Preliminary studies included library research and investigation of BLM mining claim and mineral lease records. Bureau of Mines and other production records were searched and pertinent data compiled. Field studies involved ground searches for deposits of zeolite 1/ and diatomite 2/ within and adjacent to the studied areas in localities which appeared favorable for those commodities. Field studies also involved searches for mineralized areas that may have had unreported mining-related activity. Several occurrences of sedimentary rocks which appeared zeolitic were noted, all in the eastern portion of the Sheepshead Mountains study area and in the northwestern portion of the Wildcat Canyon WSA. Two areas of diatomaceous sediments were examined, one was near White Sage Flat in the southern portion of the Table Mountain study area (fig. 3) and the other was near Grass Canyon in the northeastern portion of the Wildcat Canyon study area (fig. 4). Eleven samples were taken and sent for analysis of possible zeolitic material, and ten samples were taken of sediments containing diatomite. Fifteen reconnaissance pan samples of alluvium were taken from the areas studied, and one was taken from an inactive clate north of the Sheepshead Mountains study area. Playas in and around the study areas were examined for crusts of borate minerals.

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analysis to identify which types of zeolites were present. Alluvial samples, partially concentrated in the field, were further concentrated on a laboratory-sized Wilfley table. Resulting heavy-mineral fractions were scanned with a binocular microscope to determine content. When gold was detected it was recovered by amalgamation. Concentrates were also checked for radioactivity and fluorescence.


## ACKNOWLEDGEMENTS

The author would like to thank Roger Brittain of the Burns BLM office for his help during the examination of the study area.


## GEOLOGIC SETTING

Rock types in the study areas consist of a series of basalt and andesite flows and breccias of the Miocene-age Steens Basalt (Baldwin, 1959, p. 106-107; Walker and Repenning, 1965). These rocks cover 10,000 $mi^2$ in southeastern Oregon and southwestern Idaho and have an estimated thickness of 5,000 ft (Walker, 1970, p. 226; Avent, 1970, p. 140). They have been correlated, stratigraphically and temporally, with the Owyhee Basalt and the Columbia River Basalt Group, although they differ somewhat chemically (Walker, 1970, p. 223; Avent, 1970, p. 139). Their age has been determined radioisotopically to be between 14.5 to 14.7 million years (Luedtke and Smith, 1982; Walker and Repenning, 1966; Walker, 1977). Most of the flows consist of olivine basalt with textures ranging from fine-grained to porphyritic (Lund and Bentley, 1976, p. 61). Individual flows range from 2 to 80 ft thick, but they average around 15 ft in thickness (Fryberger, 1959, p. 29). Interbedded with the volcanic rocks are tuffs and tuffaceous sedimentary rocks which locally contain diatomaceous sediments (Mathews and others, 1983, p. II-4; U.S. Bureau of Land Management, 1985 p. 66).

Pre-Tertiary rocks are not exposed in the study areas, although Paleozoic marine sedimentary and Mesozoic intrusive rocks, composing an "island arc sequence," are found to the south, near the Pueblo and Trout Creek Mountains (Walker and Repenning, 1965; Bukofski and others, 1984, p. 7). Oil and gas leases in the areas studied were presumably targeting these basement rocks (Warner, 1980, p. 19; U.S. Bureau of Land Management, 1985, p. 65).

The areas studied are located just south of the intersection of two late Cenozoic volcanic and tectonic trends. One is the Oregon-Nevada lineament (also known as the Brothers fault zone) described by Stewart and others (1975), which trends northwesterly. The other is the zone which is marked by the steep, eastward-facing scarp of Steens Mountain which trends north-northeasterly. Dikes along the fault zone are thought to be the main source of the Steens Basalt, although some flows in the vicinity of the study areas may be more local in origin (Hook, 1981, p. 41).

The areas studied are on the center and east limb of an anticline, of which the northern part of Steens Mountain forms the west limb. In the Table Mountain study area and the western portion of the Sheepshead Mountains study area, from Sheepshead Ridge westward, the topography consists of a series of linear, north-trending fault block mountains, with graben valleys that often contain dry lake beds. East of Sheepshead Ridge, in the eastern portion of the Sheepshead Mountains study area and in the Wildcat Canyon WSA, the basalts form a gently eastward-sloping plateau, though still heavily faulted and dissected by many north-trending fault-line valleys.

The nearly circular Mickey Basin does not conform to the linear, north-south structural fabric of the area. This basin is thought to be a collapsed caldera, which was subsequently covered by Miocene lava flows, while the fault system remained active (Hook, 1981, p. 58). This caldera may have been the source of early Miocene silicic volcanic rocks of the Pike Creek formation (Hook, 1981, p. 59). This formation does not crop out in the areas studied but may underlie them. Following caldera activity, the area was apparently covered by a large lake (Hook, 1981, p. 59; Warner, 1980, p. 20). Mickey Hot Spring is several miles southwest of this basin and lies on a fault which continues from the hot spring northward along the edge of Mickey Basin, then northward into the Table Mountain study area.

Another feature which does not comform to the regional north-south linear fabric is the arcuate valley which lies east of the northeastern edge of Mickey Basin and trends eastward, then gently curves southeastward. This broad valley, drained by Wildcat Creek, separates the more mountainous Wildcat Canyon WSA from the lower terrain and more subdued topography farther south. It appears to be fault-controlled and terminates the north-trending faults which predominate in the study areas (Bukofski and others, 1984, plate CXXXI) of this report.

To the east of the areas studied, the Rome beds were deposited in a northward-plunging basin filled with an alkaline, saline lake (Ellison, 1968, p. 35 and 52; Baldwin, 1959, p. 107; Santini and LeBaron, 1982, p. 2). Rocks of the Rome formation consist of tuffaceous sediments and other volcanically derived material, in some of which diagenetic alteration has produced zeolite and fluorite (Ellison, 1968; Santini and LeBaron, 1982). Prefield work indicated the possibility that these or similar sediments may occur in the study areas, although Ellison (1968, p. 35, 52) states that the zeolite- and fluorite-bearing strata are restricted to an area east of sections 13 and 14 in T. 31 S., R. 40 E., near Crooked Creek. These sections are 12 to 15 mi east of the Sheepshead Mountains and Wildcat Canyon study areas.

## MINING HISTORY

No mining claims have been located within any of the areas studied, nor have any mining districts included any portions of the study areas (Bradley, 1982). One mining claim located near the Sheepshead Mountains study area was filed in 1979, possibly for placer gold, but was subsequently abandoned.

## APPRAISAL OF MINERAL RESOURCES

The GEM (geology, energy, and minerals) study (Mathews and others, 1983) and the U.S. Bureau of Land Management (1985) found areas favorable for diatomite within all three areas studied, although they did not show the same locations. During our study, two localities (figs. 3 and 4) were found to have sedimentary sections containing strata of diatomaceous silica, but neither one of these can be classified as a resource. At one of the localities, White Sage Flat in the southern portion of Table Mountain study area, two sites having diatomaceous sediments were sampled. Microscopic analysis revealed that the diatomite here contained too much carbonate, clay, and quartz.

The other locality examined, in the northeastern portion of the Wildcat Canyon WSA, had diatomaceous sediments that looked suitable microscopically. Whole rock analyses (table 1) showed the samples contained up to 14 percent aluminum oxide and 1 to 2 percent iron oxide, which may make them unsuitable for some or all industrial uses (R. A. Winters, interoffice memo, 1984). This occurrence contains an estimated 440,000 tons of diatomaceous earth. Besides the iron and aluminum oxides, an additional drawback to the development of this occurrence is a 0.5-ft-thick ash layer which occurs between the diatomaceous strata. For diatomite "to be minable, a deposit must be large, have few impurities, be well drained and advantageously located with respect to transportation" (Wagner, 1969, p. 206). The Wildcat Canyon diatomite would have difficulty in meeting these criteria. A deposit in this area would also have to compete with the recently opened Eagle-Picher mine, 60 mi to the north, which is closer to markets in both Boise, ID, and Burns, OR, and has 40 years of diatomite reserves (Brittain, 1986, p. 108).

There is a well-known occurrence of zeolite and fluorite in a volcanic tuff approximately 15 mi southeast of the Sheepshead Mountains study area in lacustrine (lake) sediments of Pliocene age (Sheppard and Gude, 1969; p. D73, Bastien and others, 1973; Benjamin and McMahan, 1982). Both commodities occur in amounts which are subeconomic at present.

Rocks of the same formation are mapped near the southeastern boundary of the Sheepshead Mountains study area and near the northeastern boundary of the Wildcat Canyon WSA (Walker and Repenning, 1965; Walker, 1977; Bukofski and others, 1984, plate CXXXI). An area in the southeastern portion of the Sheepshead Mountains study area and a small area in the northeastern portion of the Wildcat Canyon WSA were previously considered to have medium potential for zeolites (U.S. Bureau of Land Management, 1985; Mathews and others, 1983).

TABLE 1.--Analyses of diatomite samples from Wildcat Canyon WSA, Harney and Malheur Counties, OR

| Sample no. | $SiO_2$ % | $Al_2O_3$ % | $Fe_2O_3$ % | MgO % | CaO % | $Na_2O$ % | $K_2O$ % | $TiO_2$ % | $P_2O_5$ % | Mno % | LOI 1/ % |
|---|---|---|---|---|---|---|---|---|---|---|---|
| GWC 004 | 58.14 | 7.86 | 1.12 | 1.52 | 7.75 | 0.037 | 0.10 | 0.380 | 0.36 | 0.01 | 19.16 |
| GWC 005 | 57.53 | 10.88 | 1.19 | 1.69 | 8.97 | .058 | .22 | .510 | .36 | .02 | 14.81 |
| GWC 011 | 61.17 | 14.29 | 2.27 | 2.73 | 2.66 | .073 | .10 | .790 | .41 | .01 | 12.79 |
| GWC 012 | 67.84 | 10.13 | 2.02 | 1.95 | 2.00 | .011 | .06 | .460 | .51 | .01 | 11.93 |

1/ LOI: Loss on ignition. The loss in weight resulting from heating a sample to 1000 °C, which includes volatilized organic material and water.

Eleven sites of suspected zeolites from these and other areas were sampled and tested with a field test for cation exchange (Helfferich, 1964, p. 1753). Although all of the areas examined tested positive for zeolite using the field test, none of the samples were found to contain zeolite. Instead, they contained smectite (clay mineral group that possesses swelling properties and high cation-exchange capacities) or other minerals which apparently reacted to the test. The amount and quality of smectite was not sufficient to warrant further evaluation as a resource.

Three out of fifteen reconnaissance placer samples (figs. 2, 3, 4) had small amounts of gold. One was from a drainage on the western edge of the Table Mountain study area. Two samples were from the Wildcat Canyon WSA; one was from a tributary of Bone Creek in the extreme southeastern portion of that area, and the other was from Mickey Canyon, a tributary of Wildcat Creek, which drains the southwestern portion of that study area. The amount of gold contained in the three samples was 0.02, 0.05, and 0.09 mg, the equivalent of \$0.03, \$0.15, and \$0.26/$yd^3$ of alluvium (calculated at a gold price of \$400/oz), which is not economically recoverable. No stream deposits were noted, except in the active channels which have no appreciable volume of gravel. These concentrations of gold would only be of interest for recreational panning. There is no known lode source for this gold.

On the basis of geochemical stream sediment sampling, several portions of the three study areas had been assigned medium potential for gold, silver, copper, and mercury (Rimal, 1983; Bukofski and others, 1984; U.S. Bureau of Land Management, 1985). These localities consisted of a large area in the northern part of the Wildcat Canyon WSA and the southeastern part of the Sheepshead Mountains study area, a small area in the northwestern portion of the Sheepshead Mountains study area, and a small area near the southwestern extremity of the Table Mountain study area. The suite of anomalies detected indicated the possibility of gold, silver, copper, and mercury in quartz-vein type mineralization (Bukofski and others, 1984, p. 74). No evidence of this type of mineralization was observed, although there is nearby hydrothermal activity, and placer gold is present.

Erikson and Curry (1977) in their examination of uranium prospects in the nearby Steens-Pueblo Mountains mining district observed that uranium occurs in and adjacent to rhyolite breccias and dikes in the Pike Creek Formation. That formation does not crop out in or near the areas studied.

The Mickey Basin vicinity has the potential for generating up to 160 megawatts of electricity from geothermal steam (U.S. Bureau of Land Management 1985, p. 65). The Table Mountain study area is adjacent to the Mickey Hot Springs KGRA (Known Geothermal Resource Area), which includes Mickey Basin (U.S. Bureau of Land Management, 1985, map 5). In 1984, six geothermal leases covered 7,376 acres in the Table Mountain WSA (U.S. Bureau of Land Management, 1985, p. 65). As of March 1987, there were no leases on record for the areas studied for this report. No geothermal drilling has been reported in the study areas (Woller and others, 1986), and no geothermal manifestations were noted in the area.

In 1984, nine oil and gas leases covered a total of 18,000 acres in the Table Mountain WSA, and two oil and gas leases covered 3,700 acres in the Sheepshead Mountains WSA (U.S. Bureau of Land Management, 1985). These leases may have been targeting Cenozoic lake sediments or Paleozoic marine sediments (Warner, 1980, p. 21). As of March 1987, there were no leases in any of the areas studied. There has been no recorded exploration (King, 1985; Olmstead, 1986).

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